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10/761,605	01/21/2004	Jaiganesh Balakrishnan	TI-35883	3504

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
2611	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/761,605	BALAKRISHNAN ET AL.	
	Examiner	Art Unit	
	EVA Y. PUENTE	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29 and 31-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,14-21,23-29,31-43* is/are rejected.

7)☒ Claim(s) *13 and 22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Amendment, filed 2/26/08, with respect to the rejection(s) of claim(s) 1-29, and 31-43 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made.

2. The indicated allowability of claims 7, 25-26, 33 and 34 are withdrawn in view of the newly discovered reference(s). Rejections based on the newly cited reference(s) follow.

Claim Objections

3. Claim 13 and 22 are objected to because of the following informalities: please show the symbol "α and β are weighting factors".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application

> filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-8, 14-19, and 25 are rejected under 35 U.S.C. 102(e) as being unpatentable by Richards et al. (US 2002/0075972).

a) Regarding claim 1, Richards et al disclose a method for sampling a signal (received signal 1006 in Fig. 10) comprising:

matching the signal to a first receive pulse shape (1008 in Fig. 10; [0192,0193]);

matching the signal to a second receive pulse shape (1026 in Fig. 10; [0194]);

sampling outputs from the first and second matching (1012 and 1034 in Fig. 10); and

creating an output signal from the sample outputs (1046 in Fig. 10).

b) Regarding claims 2 and 15, Richards et al. disclose wherein the first and the second receive pulse shapes are essentially equal, and wherein the first receive pulse shape has been advanced a first time offset and the second received pulse shape has been retarded a second time offset (pulse 1074 is delayed with 0.125nsec and correlate with the received signal in the first correlator (1076 in Fig. 10); pulse 1074 is delayed with 5.0nsec and correlate with the received signal in the second correlator (1080 in Fig. 10); see [0197]).

c) Regarding claims 3 and 16, Richards et al. disclose wherein the first time offset and the second time offset are essentially equal (pulse 1104a in Fig. 11A is advanced and pulse 1112b is retarded, wherein, it is clearly interpreted that the offset for the two pulses is the same, i.e., 5.0nsec).

d) Regarding claim 4, Richards et al. disclose wherein the first and the second time offsets can be determined from characteristics of the signal ([0171], lines 1-7, wherein, the correlation function is interpreted as the characteristics of the signal).

e) Regarding claim 5, Richards et al. disclose wherein the first and the second time offsets can be determined adaptively ([0176], lines 9-11, wherein, 'based on information modulation' is interpreted to be equivalent to adaptively).

f) Regarding claim 6, Richards et al. disclose wherein the sampling occurs at the same time for each output (1012 and 1034 in Fig. 10).

g) Regarding claim 7, Richards et al disclose a method for sampling a signal (received signal 1006 in Fig. 10) comprising:

matching the signal to a first receive pulse shape (1008 in Fig. 10; [0192,0193]);

matching the signal to a second receive pulse shape (1026 in Fig. 10; [0194]);

sampling at the same time, and at a sampling rate that can be determined from expected characteristics of the signal, outputs from the first and second matching (1012 and 1034 in Fig. 10; [0171], lines 1-7, wherein, the correlation function is interpreted as the characteristics of the signal); and

creating an output signal from the sample outputs (1046 in Fig. 10).

h) Regarding claim 8, Richards et al disclose wherein the creating comprises adding the sampled outputs together (1027 in Fig. 10).

i) Regarding to claim 14, Richards et al disclose a method for reducing sensitivity to sample timing errors comprising:

matching a received signal (received signal 1006 in Fig. 10) to a first received pulse shape, wherein the first received pulse shape is a representation of a pulse carried in the received signal (1008 in Fig. 10; [0192,0193]);

matching the received signal to a second receive pulse shape, wherein the second received pulse shape is a representation of the pulse carried in the received signal (1026 in Fig. 10; [0194]);

sampling outputs from the first and second matching (1012 and 1034 in Fig. 10); and

combining the sampled to create an output signal (1027 and 1046 in Fig. 10).

g) Regarding claim 17, Richards et al. disclose wherein the first and the second time offsets can be chosen based upon an auto-correlation function of the pulse ([0171], lines 1-7, wherein, the 'correlation function' is clearly equivalent the auto-correlation function).

k) Regarding claim 18, Richards et al. disclose wherein the first and the second time offsets can be chosen adaptively ([0176], lines 9-11, wherein, 'based on information modulation' is interpreted to be equivalent to adaptively).

l) Regarding claim 19, Richards et al. disclose wherein in an additive white Gaussian noise situation, the outputs can be combined by addition ([0167], lines 5-7 and [0215], lines 13-15, wherein, 'optimize signal to noise ratio' is interpreted to include encompassing optimization when white Gaussian noise is present, as such noise is what is referred to when noise is generally referenced).

m) Regarding to claim 25, Richards et al disclose a method for reducing sensitivity to sample timing errors comprising:

matching a received signal (received signal 1006 in Fig. 10) to a first received pulse shape, wherein the first received pulse shape is a representation of a pulse carried in the received signal (1008 in Fig. 10; [0192,0193]);

matching the received signal to a second receive pulse shape, wherein the second received pulse shape is a representation of the pulse carried in the received signal (1026 in Fig. 10; [0194]);

sampling outputs from the first and second matching (1012 and 1034 in Fig. 10); and

combining the sampled to create an output signal (1027 and 1046 in Fig. 10).

adjusting sample timing (1048, 1049, 1050, 1052, 1054, and 1056 in Fig. 10; [0221],[0225]).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 9-12, 20, 21, 23, 24, 26, 29, 31- 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. (US 2002/0075972) in view of Applicant Admitted Prior Art (AAPA).

a) Regarding claims 9-12, 20, 21, 23 and 24, Richards et al. disclose all the subject matters above except for the specific teaching of multiply each sample with a weighting factor prior to the adding. However, AAPA disclose a conventional receiver system using pulse-matched filter (305 in Fig. 3). The output from the pulse-matched filter is equalized by a channel equalizer (335) prior to decoding ([0038]). There are different types of equalizer, including decision feedback (DFE) or maximum-likelihood sequence estimator (MLSE). It is well known that an equalizer comprises a plurality of weighting factors in a tapped-delay line fashion to minimize intersymbol interference. The weighting factors can be adaptive or non-adaptive. Therefore, it is obvious to one of ordinary skill in the art to implement the channel equalizer teaching of AAPA with the receiver system of Richards et al. By doing so, reduce the effects of any multipath interferences.

b) Regarding claim 26, Richards et al. disclose the adjusting comprises comparing early, on-time, and late sampling of a sample ([0221]). Richards is silent about setting the sample timing to the sampling of a largest value. However, AAPA disclose that a common prior technique for adjusting sample timing is to compare samples and sample timing is adjusted to maximize received signal strength. Therefore, it is obvious to one of ordinary skill in art to adjust the sample timing of Richards et al. to the largest value of sample to maximize signal strength.

c) Regarding to claim 29, Richards et al disclose a circuit (Fig. 10) comprising:

a first matched filter coupled to a signal input (received signal 1006 in Fig. 10), the first matched filter containing circuitry to compare a pulse provided by the signal input to a first receive pulse shape and to provide an output sample based upon the comparison (1008 in Fig. 10; [0192, 0193]; wherein, matching, as claimed, is interpreted according to the drawings of the instant disclosure at blocks 615, 617 of figure 7);

a second matched filter coupled to a signal input (received signal 1006 in Fig. 10), the second matched filter containing circuitry to compare a pulse provided by the signal input to a second receive pulse shape and to provide an output sample based upon the comparison (1026 in Fig. 10; [0194]; wherein, matching, as claimed, is interpreted according to the drawings of the instant disclosure at blocks 615, 617 of figure 7).

Richards et al. disclose all the subject matters above except for the specific teaching of an equalizer. However, AAPA disclose a conventional receiver system comprises a band filter (310), amplifier (315), and pulse-matched filter (305 in Fig. 3). The output from the pulse-matched filter is equalized by a channel equalizer (335) prior to decoding ([0038]). There are different types of equalizer, including decision feedback (DFE) or maximum-likelihood sequence estimator (MLSE). It is well known that an equalizer comprises a plurality of weighting factors in a tapped-delay line fashion to minimize intersymbol interference. The weighting factors can be adaptive or non-adaptive. Therefore, it is obvious to one of ordinary skill in the art to implement the

channel equalizer teaching of AAPA with the receiver system of Richards et al. By doing so, reduce the effects of any multipath interferences.

d) Regarding claim 31, AAPA disclose wherein the matched filter comprises:

a multiplier to multiply the pulse with a receive pulse shape (320 in Fig. 3);

an integrator coupled to the multiplier, the integrator to accumulate a value from an output produced by the multiplier (325 in Fig. 3); and

a sampler coupled to, the integrator, the sampler to periodically create a sample based upon the accumulated value from the integrator (330 in Fig. 3; [0038]).

e) Regarding claim 32, AAPA disclose wherein the sampler is a switch that periodically closes to produce a sample (330 in Fig. 3; [0038]).

f) Regarding claim 33, Richards et al disclose a circuit (Fig. 10) comprising:

a first matched filter coupled to a signal input (received signal 1006 in Fig. 10), the first matched filter containing circuitry to compare a pulse provided by the signal input to a first receive pulse shape and to provide an output sample based upon the comparison (1008 in Fig. 10; [0192, 0193]; wherein, matching, as claimed, is interpreted according to the drawings of the instant disclosure at blocks 615, 617 of figure 7);

a second matched filter coupled to a signal input (received signal 1006 in Fig. 10), the second matched filter containing circuitry to compare a pulse provided by the signal input to a second receive pulse shape and to provide an output sample based upon the comparison (1026 in Fig. 10; [0194]; wherein, matching, as claimed, is interpreted according to the drawings of the instant disclosure at blocks 615, 617 of figure 7).

Richards et al. disclose the received signals are correlated (multiplied) with signals generated by the code generator to produce samples 1010 and 1032. Richards et al. is silent about an integrator, and a switch in the matched filter. However, AAPA disclose a conventional receiver system comprises a band filter (310), an amplifier (315), and pulse-matched filter (305 in Fig. 3). The pulse-matched filter comprises a multiplier (320) to multiply the pulse with a receive pulse shape; an integrator (325) coupled to the multiplier and to accumulate a value from an output produced by the multiplier; and a switch (330) periodically creating a sample based upon the accumulated value from the integrator ([0037][0038]). Therefore, it is obvious to one of ordinary skill in the art to combine the integrator and switch in matched filter as taught by AAPA with the receiver system of Richards et al. By doing so, provide a better sample timing control receiver in a wireless communication system.

g) Regarding claim 34, AAPA disclose wherein the period is further based upon a data rate of information carried in the pulse provided by the signal input ([0038]).

h) Regarding claim 35, Richards et al. disclose wherein the first received pulse shape is advanced version of the pulse and the second receive pulse shape is a retarded version of the pulse (pulse 1074 is delayed with 0.125nsec and correlate with the received signal in the first correlator (1076 in Fig. 10); pulse 1074 is delayed with 5.0nsec and correlate with the received signal in the second correlator (1080 in Fig. 10); see [0197]).

i) Regarding claim 36, Richards et al disclose a receiver (Fig. 10) comprising:

a first matched filter coupled to a signal input (received signal 1006 in Fig. 10), the first matched filter containing circuitry to compare a pulse provided by the signal input to a first receive pulse shape and to provide an output sample based upon the comparison (1008 in Fig. 10; [0192, 0193]; wherein, matching, as claimed, is interpreted according to the drawings of the instant disclosure at blocks 615, 617 of figure 7);

a second matched filter coupled to a signal input (received signal 1006 in Fig. 10), the second matched filter containing circuitry to compare a pulse provided by the signal input to a second receive pulse shape and to provide an output sample based upon the comparison (1026 in Fig. 10; [0194]; wherein, matching, as claimed, is interpreted according to the drawings of the instant disclosure at blocks 615, 617 of figure 7); and

a decoder coupled to the first and the second matched filters, the decoder containing circuitry to detect and eliminate error that may be present in the outputs produced by the first and second match filters (data detector 1003 in Fig. 10).

Richards et al. disclose all the subject matters above except for the specific teaching of a band select filter and an amplifier. However, AAPA disclose a conventional receiver system comprises a band filter (310), an amplifier (315), and pulse-matched filter (305 in Fig. 3). The band select filter eliminates signals that are outside of a particular band of interest. The amplifier brings and output of the band select filter to a desired level ([0037]). Therefore, it is obvious to one of ordinary skill in the art to combine the band select filter and the amplifier as taught by AAPA with the

receiver system of Richards et al. By doing so, provide a better sample timing control receiver in a wireless communication system.

j) Regarding claim 37, Richards et al. disclose wherein the receiver operates in a wireless communications network ([0003]).

k) Regarding claim 38, Richards et al. disclose wherein the wireless communication network is an ultra-wideband communication network ([0003] [0006]).

l) Regarding claim 39, Richards et al. disclose wherein the wireless communication network is a carrier-less ultra-wideband communication network ([0003] [0006]).

m) Regarding claim 40, Richards et al. disclose wherein the wireless communication network is a wavelet-based ultra-wideband communication network ([0003] [0006]).

n) Regarding claim 41, AAPA disclose an equalizer coupled to the first and second matched filters, the equalizer containing circuitry to combine samples produced by the first and the second matched filters to produce an output signal (335 in Fig. 3; [0038]).

8. Claims 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. (US 2002/0075972) in view of Applicant Admitted Prior Art (AAPA), and in further view of Ariyoshi et al (US 6,049,536).

Regarding claims 42 and 43, Richards et al disclose a wireless communication receiver comprises a first matched filter, a second matched filter, and a decoder as described above. AAPA discloses a receiver comprises a band select filter, an amplifier, and an equalizer containing circuitry to combine an output to produce an

output signal (335 in Fig. 3). Richards and AAPA is silent about a despreader in the receiver.

However, Ariyoshi et al disclose a CDMA receiver comprises a despreader (603,604 in Fig. 5) having inputs coupled to a first and a second matched filter (601 in Fig. 5). The output of the matched filter derives as a correlation value and enables despread processing for fast acquisition (Col 8, L41-43). Applicant's invention is used in ultra-wideband communication system (UWB) (title; [0004]). Applicant also states that the despreader is maybe needed for communication system such as CDMA ([0047, L9-14]). Since applicant did not specifically described UWB to CDMA system conversion, it is assumed such conversion is well known and easy to achieve. Therefore, it is obvious to one of ordinary skill in art to implement the despreading process taught by Ariyoshi et al at the output of the first and second matched filters of Richards et al. By doing so, achieve faster acquisition in a communication receiver system.

9. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. (US 2002/0075972) in view of Ariyoshi et al (US 6,049,536).

Regarding claims 27 and 28, Richards et al disclose all the subject matters above except for a despreader in the receiver.

However, Ariyoshi et al disclose a CDMA receiver comprises a despreader (603,604 in Fig. 5) having inputs coupled to a first and a second matched filter (601 in Fig. 5). The output of the matched filter derives as a correlation value and enables

despread processing for fast acquisition (Col 8, L41-43). Applicant's invention is used in ultra-wideband communication system (UWB) (title; [0004]). Applicant also states that the despreader is maybe needed for communication system such as CDMA ([0047, L9-14]). Since applicant did not specifically described UWB to CDMA system conversion, it is assumed such conversion is well known and easy to achieve. Therefore, it is obvious to one of ordinary skill in art to implement the despreading process taught by Ariyoshi et al at the output of the first and second matched filters of Richards et al. Since Richards et al's sample timing recovery system has a feedback loop structure, the despreading occurs prior to adjusting sample timing and after the adjusting. Combine the teaching of Ariyoshi et al and Richards et al to achieve faster acquisition in a communication receiver system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Y Puente whose telephone number is 571-272-3049. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eva Yi Puente
/E. Y. P./
Examiner, Art Unit 2611

March 28, 2008

/CHIEH M FAN/
Supervisory Patent Examiner, Art Unit 2611